

Foreword

The 15th Conference of the International Soil Tillage Research Organization

The 15th Conference of the International Soil Tillage Research Organization was held in Fort Worth, Texas, USA, from 2 to 7 July 2000. The theme of the 15th conference was “Tillage at the threshold of the 21st century: looking ahead”. The conference sessions were conducted at the Renaissance Worthington Hotel under the direction of ISTRO President Dr. John Morrison. This was the first ISTRO Conference with a venue in the USA, and was another important step in the growth of ISTRO as a truly international organization. The breadth of challenges faced by producers of food and fiber, even in an agriculturally rich country like the USA, was evident during the pre-conference tour through the corn–soybean–wheat belt of the mid-west USA, and the post-conference tour through the cotton belt of the southern USA.

In 1840, Daniel Webster stated “When tillage begins, other art forms follow. The farmers therefore are the founders of human civilization”. While we may or may not agree that tillage is an “art form”, we probably can agree it is often beneficial, sometimes even necessary, to look back in time to gain a better perspective of what lies ahead. Thus, it was appropriate that Dr. Ratan Lal opened the 15th ISTRO Conference by presenting an overview of ISTRO’s relatively short but important history. This was followed by eight keynote speakers, each of whom addressed a different “art form” of tillage. Dr. Lal’s paper, along with the keynote papers, are published in full length in this Special Issue of Soil and Tillage Research, grouped into four general themes.

1. Tillage and soil structure

J. Guérif, G. Richard, C. Dürr, J.M. Machet, S. Recous and J. Roger-Estrade (France). A review of tillage effects on crop residue management, seedbed conditions and seedling establishment.

I.M. Young, J.W. Crawford (Scotland) and C. Rappoldt (the Netherlands). New methods and models for characterizing structural heterogeneity of soil.

The paper by Guerif et al. reviews the extensive research leading to several approaches for modeling soil structure and its effects on seedbed soil environment. Recognizing that the heterogeneous nature of soil is one of the bigger challenges to modeling soil processes, the paper by Young et al. offers insights into new theories and techniques for advancing the study of soil structure. These slightly contrasting approaches to quantifying soil structure assures continuing research and debate on how to quantify this “art form” of tillage.

2. Tillage and erosion

G. Sparovek (Brazil) and E. Schnug (Germany). Soil tillage and precision agriculture: a theoretical case study for soil erosion control in Brazilian sugarcane production.

Takken, G. Govers (Belgium), V. Jetten (The Netherlands), J. Nachtergaele, A. Steegen and J. Poesen (Belgium). Effects of tillage on runoff and erosion patterns.

Both of these papers present relatively new viewpoints on soil erosion. The paper by Sparovek and Schnug discusses how production inputs such as time and labor may be more important than other factors when considering erosion control options within precision agriculture systems. Takken et al. clearly shows the need to consider tillage direction–landscape slope interactions when modeling water runoff and soil erosion.

3. Tillage and biology

E. Klavivko (USA). Tillage systems and soil ecology.

R. Follett (USA). Soil management concepts and carbon sequestration in cropland soils.

Historically, ISTRO research has concentrated on the physical aspects of soil tillage, and to a lesser extent the chemical aspects. The biological aspects are often ignored. The paper by Kladvko provides an overview of the function and population dynamics of soil fauna as affected by tillage. The over-all “health” of soil is intimately related to the amount and kind of organic matter in the soil. Follett reviews the impact on global climate when this organic matter is lost from the soil, and discusses management schemes to capture and store soil carbon.

4. Tillage and sustainable systems

R. Fowler (South Africa) and J. Rockstrom (Kenya). Conservation tillage for sustainable agriculture: an agrarian revolution gathers momentum in Africa.

H. So, G. Kirchhof (Australia), R. Bakker (The Philippines) and G. Smith (Australia). Low input tillage/cropping systems for limited resource areas.

Increasing food and fiber needs for an expanding world population continue to put increasing

demands on balancing agricultural production with preservation of natural resources. The need to consider local cultural and societal factors in developing sustainable systems is, unfortunately, often ignored. The papers by Fowler et al. and So et al. review on-going efforts in Africa and South East Asia, respectively, to develop sustainable production systems with limited capabilities for purchase of material inputs.

On a personal note, I want to thank the four Associate Guest Editors (Trond Borresen, Thomas Colvin, Jeffry Tullberg and Dale Wilkins), and the anonymous reviewers who assisted me in editing this Special Issue of Soil Tillage Research.

I also want to express my thanks to all of the authors who contributed to this special issue, especially I. Takken and G. Govers who graciously agreed to submit an abbreviated paper on short notice; Prof. Dr. G. Várallyay (Hungary) withdrew his keynote paper on soil erosion due to health problems.

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